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EXAMINER	
MUMMERT, STEPHANIE KANE	
ART UNIT	PAPER NUMBER
1637	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/579,029	RAYMOND, CHRISTOPHER K.	
	Examiner	Art Unit	
	STEPHANIE K. MUMMERT	1637	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 December 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4,6,8-17 and 19-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,6,8-17 and 19-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *12/2/10*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Applicant's amendment filed on December 2, 2010 is acknowledged and has been entered. Claims 1, 6 and 21 have been amended. Claims 5, 7, 18, 25-42 have been canceled. Claims 1-4, 6, 8-17, 19-24 are pending.

Claims 1-4, 6, 8-17, 19-24 are discussed in this Office action.

All of the amendments and arguments have been thoroughly reviewed and considered but are not found persuasive for the reasons discussed below. Any rejection not reiterated in this action has been withdrawn as being obviated by the amendment of the claims. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

This action is made FINAL as necessitated by Amendment.

New Grounds of Rejection

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 3-4, 6, 8, 10, 12, 15, 18-21 are rejected under 35 USC 103(a) as being obvious over Lishanski et al. (Clinical Chemistry, 2000, 46:9, 1464-1470) in view of Lau et al. (Science, 2001, vol. 294, p. 858-862 as evidenced by Lau Supplemental Information). Lishanksi teaches amplification using both universal and adapter primers (Abstract).

With regard to claim 1, Lishanksi teaches a method for amplifying a molecule to produce DNA molecules, the method comprising the steps of:

(a) producing a first DNA molecule that is complementary to a target molecule using primer extension, with an extension primer comprising a first portion having a length from 3 to 17 nucleotides (p. 1465, paragraph 3, where the primer extension adapter primer comprises a 5' tail that is 20 bp in length, and a 3' portion that varies based on the SNP target detected, see Figure 3; see also forward primer for 5-bp deletion, p. 1465, where the target specific portion of the forward primer is 21 bp in length) selected to hybridize to a portion of the target molecule and a second portion that hybridizes to the complement of the universal forward primer (Figure 5, where the reaction includes a forward adapter primer with a first target specific portion and a non-target "adapter" or "universal" tail, a universal primer specific for the tail; p. 1469, col. 1, where the adapter primer generated enough amplicon to serve as a target for the universal primer); and

(b) amplifying the first DNA molecule to produce amplified DNA molecules using a universal forward primer and a reverse primer (Figure 5, where the universal/adapter forward primer is present in a 20:1 ratio with the "universal" primer that is specific for the primer tail; see figure legend and p. 1465, col. 1 and 2, where the primers and the reaction mixtures are described), wherein the reverse primer is selected to specifically hybridize to a portion of the first DNA

molecule that is complementary to the target under defined hybridization conditions (Figure 5, where the reverse primer has a portion that hybridizes to the target under defined hybridization conditions and see p. 1465 where the sequence is provided).

With regard to claim 3, Lishanski teaches an embodiment of claim 1 wherein the primer extension uses an extension primer having a length in the range of from 10 to 100 nucleotides or 20 to 35 nucleotides (p. 1465, paragraph 3, where the primer extension adapter primer comprises a 5' tail that is 20 bp in length, and a 3' portion that varies based on the SNP target detected, see Figure 3 for SNP assay numbers, amplicon length and reference 6 to NCBI dbSNP database and the amplicon lengths; see also forward primer for 5-bp deletion, where the target specific portion of the forward primer is 21 bp in length, which would lead to a primer extension primer comprising a 20 bp tag and 21 bp target portion to a primer 41 bp in length).

With regard to claim 4, Lishanski teaches an embodiment of claim 1 wherein the primer extension uses an extension primer having a length in the range of from 20 to 35 nucleotides (p. 1465, paragraph 3, where the primer extension adapter primer comprises a 5' tail that is 20 bp in length, and a 3' portion that varies based on the SNP target detected, see Figure 3 for SNP assay numbers, amplicon length and reference 6 to NCBI dbSNP database and the amplicon lengths; see also forward primer for 5-bp deletion, p. 1465, where the target specific portion of the forward primer is 21 bp in length, which would lead to a primer extension primer comprising a 20 bp tag and 21 bp target portion to a primer 41 bp in length).

With regard to claim 6, Lishanski teaches an embodiment of claim 25, wherein the first portion of the extension primer has a length in the range of from 6 to 17 nucleotides (p. 1465, paragraph 3, where the primer extension adapter primer comprises a 5' tail that is 20 bp in

length, and a 3' portion that varies based on the SNP target detected, see Figure 3; see also forward primer for 5-bp deletion, p. 1465, where the target specific portion of the forward primer is 21 bp in length).

With regard to claim 8, Lishanski teaches an embodiment of claim 1, wherein the second portion has a length of from 18 to 25 nucleotides (p. 1465, paragraph 3, where the primer extension adapter primer comprises a 5' tail that is 20 bp in length).

With regard to claim 10, Lishanski teaches an embodiment of claim 1 wherein the universal forward primer has a length in the range of from 16 nucleotides to 100 nucleotides (p. 1465, parargraph 3, where the universal forward primer sequence is provided and is 20 bp in length).

With regard to claim 12, Lishanski teaches an embodiment of claim 1, wherein the universal forward primer hybridizes to the complement of the second portion of the extension primer (Figure 5, where the reaction includes a forward adapter primer with a first target specific portion and a non-target "adapter" or "universal" tail, a universal primer specific for the tail; p. 1469, col. 1, where the adapter primer generated enough amplicon to serve as a target for the universal primer).

With regard to claim 15, Lishanski teaches an embodiment of claim 1 wherein the reverse primer has a length in the range of from 10 nucleotides to 100 nucleotides (p. 1465, where the reverse extension adapter primer comprises a 5' tail that is 20 bp in length).

With regard to claim 19 and 21, Lishanski teaches an embodiment of claim 1 or 21, further comprising the step of measuring the amount of amplified DNA molecules (Figures 3-4

and Tables 1-2, where the amount of amplified DNA is detected, following branch migration analysis).

With regard to claim 20, Lishanski teaches an embodiment of claim 1 wherein amplification is achieved by multiple successive PCR reactions (p. 1465, col. 1, where the PCR was carried out for 35 cycles).

With regard to claim 21, Lishanski teaches a method for measuring the amount of a target in a sample from a living organism, the method comprising the step of measuring the amount of a target molecule in a multiplicity of different cell types within a living organism, wherein the amount of the target molecule is measured by a method comprising the steps of:

(1) producing a first DNA molecule complementary to the target molecule in the sample using primer extension (Figure 5, where the reaction includes a forward adapter primer with a first target specific portion and a non-target "adapter" or "universal" tail, a universal primer specific for the tail; p. 1469, col. 1, where the adapter primer generated enough amplicon to serve as a target for the universal primer) with an extension primer comprising a first portion having a length from 3 to 17 nucleotides (p. 1465, paragraph 3, where the primer extension adapter primer comprises a 5' tail that is 20 bp in length, and a 3' portion that varies based on the SNP target detected, see Figure 3; see also forward primer for 5-bp deletion, p. 1465, where the target specific portion of the forward primer is 21 bp in length);

(2) amplifying the first DNA molecule to produce amplified DNA molecules using a universal forward and a reverse primer (Figure 5, where the universal/adapter forward primer is present in a 20:1 ratio with the "universal" primer that is specific for the primer tail; see figure legend and p. 1465, col. 1 and 2, where the primers and the reaction mixtures are described).

Regarding claim 1, 18, 21, Lishanksi does not teach that the primer extension reaction is carried out on a microRNA target. With regard to claim 1 and 18, Lau teaches a method of detection of microRNA targets.

With regard to claim 1 and 21, Lau teaches a method for amplifying a microRNA molecule to produce DNA molecules, the method comprising the steps of:
(a) producing a first DNA molecule that is complementary to a target microRNA molecule using primer extension (p. 862, col. 1, 23, where the size fractionated RNAs are ligated with 3' adaptor using T4 RNA ligase, followed by ligating a 5' adaptor and the ligation products were reverse transcribed resulting in cDNA, see p. 4 supplemental information).

With regard to claim 18, Lau teaches an embodiment of claim 1 wherein the primer is selected to specifically hybridize to a DNA molecule complementary to a selected microRNA molecule under defined hybridization conditions (p. 862, col. 1, 23, where the size fractionated RNAs are ligated with 3' adaptor using T4 RNA ligase, followed by ligating a 5' adaptor and the ligation products were reverse transcribed resulting in cDNA, see p. 4 supplemental information).

Regarding claims 1, 4, 6 and 21, Lishanski does not teach the exact lengths of primer as claimed. However, an ordinary practitioner would have recognized that the results optimizable variables of time, product amount and primer length could be adjusted to maximize the desired results. As noted in In re Aller, 105 USPQ 233 at 235,

> More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.

Routine optimization is not considered inventive and no evidence has been presented that the primer length was other than routine, that the products resulting from the optimization have any unexpected properties, or that the results should be considered unexpected in any way as compared to the closest prior art.

Furthermore, it would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made to have applied the format of tagged and tailed primers of Lishanski to the detection of microRNA sequences as taught by Lau to arrive at the claimed invention with a reasonable expectation for success. As taught by Lishanski, "To avoid making expensive labeled primers for each amplicon to be analyzed, we developed a different protocol (Fig. 5). The forward primer was a 9:1–20:1 mixture of a universal labeled primer and a sequence-specific adapter primer. The universal primer sequence was derived from a bacterial cloning vector. The 3' proximal domain of the adapter primer was complementary to the target genomic DNA, and its 59 proximal domain was identical to the universal primer. In the first few rounds of PCR, the adapter primer generated enough amplicon to serve as a target for the universal primer. The final PCR product was suitably labeled for subsequent LOCI detection. The use of a universal primer for similar purposes has been reported by others (11)". While Lishanski uses the tagged and universal forward primer as part of a branch migration analysis, the format of the primers and the concept of tagged and tailed primers, followed by universal amplification using the tag specific primers as depicted in Figure 5 could be applied to the detection of a variety of targets, including microRNA targets as taught by Lau. Regarding microRNA, Lau notes "We report on 55 previously unknown miRNAs in C. RNAs that are about 20 24 nt in C. elegans. The miRNAs have diverse expression patterns during development"

(Abstract). Lau also notes "We and the two other groups reporting in this issue of the journal refer to this class of tiny RNAs as microRNAs, abbreviated miRNAs" (p. 858, col. 3). Therefore, one of ordinary skill in the art at the time the invention was made would have been motivated to have applied the format of tagged and tailed primers of Lishanski to the detection of microRNA sequences as taught by Lau to arrive at the claimed invention with a reasonable expectation for success.

Claims 2, 13-14, 16-17 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lishanski et al. (Clinical Chemistry, 2000, 46:9, 1464-1470) in view of Lau et al. (Science, 2001, vol. 294, p. 858-862 as evidenced by Lau Supplemental Information) as applied to claims 1, 3-4, 6, 8, 10, 12, 15, 18-21 above and further in view of Braasch et al. (Chemistry & Biology, 2001, p. 1-7). Lishanksi teaches amplification using both universal and adapter primers (Abstract).

With regard to claim 2 and 22, Lishanski teaches an embodiment of claim 1 and 21, wherein at least one of the universal forward primer and the reverse primer (Figure 5, where the universal/adapter forward primer is present in a 20:1 ratio with the "universal" primer that is specific for the primer tail; see figure legend and p. 1465, col. 1 and 2, where the primers and the reaction mixtures are described).

With regard to claim 13-14, Lishanski teaches an embodiment of claim 2 and 13, wherein the universal forward primer (Figure 5, where the universal/adapter forward primer is present in a 20:1 ratio with the "universal" primer that is specific for the primer tail; see figure legend and p. 1465, col. 1 and 2, where the primers and the reaction mixtures are described).

With regard to claim 16-17, Lishanski teaches an embodiment of claim 2 and 16, wherein the reverse primer (Figure 5, where the universal/adapter forward primer is present in a 20:1 ratio with the "universal" primer that is specific for the primer tail; see figure legend and p. 1465, col. 1 and 2, where the primers and the reaction mixtures are described).

Regarding claim 2, 13-14, 16-17 and 22, Lau does not teach that the primer, either the forward or reverse comprise a locked nucleic acid molecule. Braasch teaches primers and complementary sequences comprising locked nucleic acids (Abstract).

With regard to claims 2, 13, 16 and 22, Braasch comprises at least one locked nucleic acid molecule (Figure 1, where the locked nucleic acid structure is provided).

With regard to claims 14 and 17, Braasch teaches wherein the primer comprises from 1 to 25 locked nucleic acid molecules (Figure 1, where the locked nucleic acid structure is provided).

It would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made to have extended the teachings of Lishanski and Lau to include the locked nucleic acids of Braasch to arrive at the claimed invention with a reasonable expectation for success. As taught by Braasch, "locked nucleic acid is an RNA derivative in which the ribose ring is constrained by a methylene linkage between the 2' oxygen and the 4' carbon" and "increases binding affinity for complementary sequences and provides an exciting new chemical approach for the control of gene expression and optimization of microarrays" (Abstract). Braasch also teaches, "LNAs possess extraordinarily high affinities for complementary sequences and forcefully suggest that LNAs have the potential to be improved agents for oligonucleotide arrays" (p. 6, col. 2). Therefore, one of ordinary skill in the art at the time the invention was made would have been motivated to have extended the teachings of Lishanski and

Lau to include the locked nucleic acids of Braasch to arrive at the claimed invention with a reasonable expectation for success.

Claims 9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lishanski, in view of Lau et al. (Science, 2001, vol. 294, p. 858-862 as evidenced by Lau Supplemental Information) as applied to claims 1, 3-4, 6, 8, 10, 12, 15, 18-21 above and further in view of Crollius et al. (Nature Genetics, 2000, 25(2):235-238) and Buck et al. (Biotechniques, 1999, 27:528-536).

Lishanski in view of Lau render obvious the limitations of claims 1, 3-4, 6, 8, 10, 12, 15, 18-21 as recited in the obviousness rejection above. However, neither Lau or Spivack teach SEQ ID NO:1 or 13.

With regard to claim 9 and 11, Crollius teaches an embodiment of claim 1, wherein the second portion of the extension primer has a nucleic acid sequence comprising the nucleic acid sequence of SEQ ID NO:1 and wherein the universal forward primer consists of the nucleic acid sequence set forth in SEQ ID NO:13 (see alignment below, where AL302487 of Crollius teaches a sequence which comprises SEQ ID NO:1 or 13, and where the sequences are the same, as evidenced by sequence listing).

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Qy          1 CATGATCAGCTGGGCCAAGA 20
              ||||||||||||||||||||
Db        699 CATGATCAGCTGGGCCAAGA 680
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It would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made to have adjusted the teachings of Barad and Spivack to use a variety of adaptor/primer tag sequences, including the sequence comprising SEQ ID NO:1 and 13 as taught

by Roest in view of Buck. Regarding the universal tag, Spivack teaches, "The present invention relates to 'Universal RT-coupled PCR', a novel PCR strategy that takes advantage of the poly-A tail of processed mRNA, and uses novel 'Universal RT primers' that comprise a unique 5′ tag sequence that does not occur in the genome of the organism being studied (for example the human genome), a poly-T midsection, and a 3′ anchor to avoid slippage. These 5′ tag-enhanced 'Universal RT primers' reliably initiate reverse transcription, and the unique sequence of the 5′ tag is then targeted by the PCR primers (paragraph 53)". While Crollius' sequences puffer fish genomes, it would have been prima facie obvious to one of ordinary skill in the art to have included a variety of adaptor/primer tag sequences. Furthermore, in view of the guidance by Spivack that the unique sequence does not occur in the genome of the organism being studied, choosing a sequence from an unrelated organism like the Tertraodon nigroviridis falls in line with the teachings of Spivack. Therefore, one of ordinary skill in the art at the time the invention was made would have been motivated to have adjusted the teachings of Barad and Spivack to use a variety of adaptor/primer tag sequences, including the sequence comprising SEQ ID NO:1/13 as taught by Roest in view of Buck.

Regarding Buck, in the recent court decision In Re Deuel 34 USPQ 2d 1210 (Fed. Cir. 1995), the Court of Appeals for the Federal Circuit determined that the existence of a general method of identifying a specific DNA does not make the specific DNA obvious. Regarding structural or functional homologs, however, the Court stated,

"Normally, a prima facie case of obviousness is based upon structural similiarity, i.e., an established structural relationship between a prior art compound and the claimed compound. Structural relationships may provide the requisite motivation or suggestion to modify known compounds to obtain new compounds. For example, a prior art compound may suggest its homologs because homologs often have similar properties and therefore chemists of ordinary

skill would ordinarily contemplate making them to try to obtain compounds with improved properties (see page 9, paragraph 4 of attached ref)."

Since the claimed primers simply represent structural homologs, which are derived from sequences suggested by the prior art as useful for primers and probes for the detection of puffer fish genome, and concerning which a biochemist of ordinary skill would attempt to obtain alternate compounds with improved properties, the claimed primers and probes are prima facie obvious over the cited references in the absence of secondary considerations.

Buck expressly provides evidence of the equivalence of primers. Specifically, Buck invited primer submissions from a number of labs (39) (page 532, column 3), with 69 different primers being submitted (see page 530, column 1). Buck also tested 95 primers spaced at 3 nucleotide intervals along the entire sequence at issue, thereby testing more than 1/3 of all possible 18-mer primers on the 300 base pair sequence (see page 530, column 1). When Buck tested each of the primers selected by the methods of the different labs, Buck found that EVERY SINGLE PRIMER worked (see page 533, column 1). Only one primer ever failed, No. 8, and that primer functioned when repeated. Further, EVERY SINGLE CONTROL PRIMER functioned as well (see page 533, column 1). Buck expressly states "The results of the empirical sequencing analysis were surprising in that nearly all of the primers yielded data of extremely high quality (page 535, column 2)." Therefore, Buck provides direct evidence that all primers would be expected to function, and in particular, all primers selected according to the ordinary criteria, however different, used by 39 different laboratories. It is particularly striking that all 95 control primers functioned, which represent 1/3 of all possible primers in the target region. This clearly shows that every primer would have a reasonable expectation of success.

Claims 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lishanski in view of Lau et al. (Science, 2001, vol. 294, p. 858-862 as evidenced by Lau Supplemental Information) as applied to claims 1, 3-4, 6, 8, 10, 12, 15, 18-21 above and further in view of

Spivack et al. (US PgPub 2003/0186288; October 2003). Lishanksi teaches amplification using both universal and adapter primers (Abstract).

Lishanski and Lau render obvious claims 1, 3-4, 6, 8, 10, 12, 15, 18-21 as noted above. However, neither of these references teach detection using quantitative PCR.

With regard to claim 23, Spivack teaches an embodiment of claim 21, wherein the amount of the amplified DNA molecules are measured using fluorescence-based quantitative PCR (paragraph 95-96, where the amplification products are subjected to agarose or polyacrylamide gel electrophoresis and stained to measure the density of the amplification product, or alternatively the primers are labeled with a fluorescent moiety; see also paragraph 36 and 43, where the samples are measured using Lightcycler as depicted in Figures 4A/B and Figures 10A/B respectively).

With regard to claim 24, Spivack teaches an embodiment of claim 21, wherein the amount of the amplified DNA molecules are measured using SYBR green dye (paragraph 95-96, where the amplification products are subjected to agarose or polyacrylamide gel electrophoresis and stained to measure the density of the amplification product, and where the stain includes SYBR green dye).

It would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made to have adjusted the teachings of Lishanski and Lau to include both a tag sequence and a portion specific to the target as taught by Spivack to arrive at the claimed invention with a reasonable expectation for success. As taught by Spivack, "The present invention relates to 'Universal RT-coupled PCR', a novel PCR strategy that takes advantage of the poly-A tail of processed mRNA, and uses novel 'Universal RT primers' that comprise a

unique 5′ tag sequence that does not occur in the genome of the organism being studied (for example the human genome), a poly-T midsection, and a 3′ anchor to avoid slippage. These 5′ tag-enhanced 'Universal RT primers' reliably initiate reverse transcription, and the unique sequence of the 5′ tag is then targeted by the PCR primers (paragraph 53)". Spivack also teaches "the novel Universal RT primer used for reverse transcription has a 3′ three-base anchor that allows the primer to be positioned on the last 3 bases of the transcript specific sequence and covers all possible combinations of the coding 3′ end of the mRNA transcript (see FIGS. 6 and 7). This allows RNA binding without slippage, and thereby avoids the generation of cDNA's of various sizes" (paragraph 58). In comparison, Lau teaches ligation of adaptors to cDNAs, and the extension primer is complementary to the adaptor. While Lau exemplifies using a reverse primer as the extension primer used to generate the cDNA, it would have been prima facie obvious, particularly in view of the adaptors, to use either a primer directed to the forward adaptor or to the reverse adaptor as the "universal" extension primer. Therefore, one of ordinary skill in the art at the time the invention was made would have been motivated to have adjusted the teachings of Lau to include both a tag sequence and a portion specific to the target as taught by Spivack to arrive at the claimed invention with a reasonable expectation for success.

Citation of Pertinent Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Tsang et al. (Biotechniques, 2004, 32:682-688) teaches multiplex amplification and genotyping using a universal adaptor sequence (Abstract).

Response to Arguments

Applicant's arguments filed December 2, 2010 have been fully considered but they are not persuasive.

Applicant traverses the rejection of claims as being obvious over Lishanksi in view of Lau. Regarding Lishanski, Applicant chiefly argues that "nowhere does Lishanski teach or remotely suggest using an extension primer comprising a first portion from 3 to 17 nucleotides in length that hybridizes to target microRNA" (p. 8 of remarks). Regarding Lau, Applicant summarizes the teaching of Lau and argues that the "Lau is directed to non-specific amplification of all microRNAs in a sample through the ligation of adaptor linkers for the purpose of cloning previously unidentified microRNA species" (p. 8 of remarks). Applicant goes on to argue that there is no reason to combine Barad and Lishanski.

In response to applicant's argument that there is no teaching, suggestion, or motivation to combine the references, the examiner recognizes that obviousness may be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988), In re Jones, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992), and KSR International Co. v. Teleflex, Inc., 550 U.S. 398, 82 USPQ2d 1385 (2007). In this case, as noted in the obviousness rejection, Lishanksi provides a method of target specific amplification. While Lau is focused on non-specific amplification for expression profiling purposes, one of skill would recognize that following an overall analysis of expression, one of skill may want to specifically amplify or detect a specific target from within the overall

profile of microRNAs. Therefore, contrary to Applicant's arguments, there is clear motivation to combine Lishanski and Lau.

Next, Applicant argues a lack of reasonable expectation for success over Lishanski. Applicant argues that the proposed combination "would result in significant primer overlap leading to primer dimerization" and since the target specific portions of the primer ranged from 19 to 25 nucleotides they "would hybridize to the entire length of the target and thus require complete overlap with the reverse primers" (p. 12 of remarks).

These arguments have been considered, but are not persuasive. While Applicant's argument regarding the structural features of the primers is noted, it is noted in response that the microRNA targets of Applicant's invention are also 20-25 nucleotides in length and the primer sequences as claimed include target specific portions that can be as long as 17 nucleotides in length. It is unclear how, if Applicant's invention is functional and has a reasonable expectation of success, a combination of references which contains the same features would not have the same expectation. While it is true that Lishanski exemplifies primer sequences that are a few nucleotides longer than the range as claimed, a difference of 2 nucleotides (19 vs. 17) or even 8 nucleotides (25 vs. 17) would significantly impact the suitability and functionality of the combination of references. Clarification of Applicant's position regarding this issue would be appreciated While primer overlap is an issue to consider, one of skill in the art of primer design would recognize the problem based on target region length. Also, as noted above, it would have been prima facie obvious to one of ordinary skill in the art to adjust the lengths of the tag and target specific portions of the primers for individual targets and target region lengths. Therefore, Applicant's arguments are not persuasive and the rejections are maintained.

Applicant's remaining arguments are based on the arguments offered against the rejection argued above. These arguments and remarks are not persuasive for the reasons asserted above.

Conclusion

No claims are allowed. All claims stand rejected.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to STEPHANIE K. MUMMERT whose telephone number is (571)272-8503. The examiner can normally be reached on M-F, 9:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Benzion can be reached on 571-272-0782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Stephanie K. Mummert/
Primary Examiner, Art Unit 1637

SKM